

## IN THE CLAIMS

Claim 1. (currently amended)      A method of digitally canceling interference in communication signals within a satellite payload on a first plurality of received signals within a satellite payload comprising adaptively canceling interference on the first plurality of received signals within the satellite payload using a second plurality of interference reference feedback signals acquired downstream from a digital processor, wherein the satellite payload receives a communication signal via a first antenna from a ground based terminal, said first antenna being coupled to an analog to digital converter to form an interference feedback signal which is transferred to a digital to analog converter to form a transmit signal which is transmitted by a second antenna to a ground based terminal.

Claim 2. (Previously Amended)      A method as in claim 1 further comprising subtracting a counter-interference signal from the first plurality of received signals to form a desired signal.

Claim 3. (Previously Amended)      A method as in claim 2 further comprising digitally processing said desired signal to generate said second plurality of interference reference feedback signals.

Claim 4. (Previously Amended)      A method as in claim 3 further comprising correlating said second plurality of interference reference feedback signals to said desired signal to generate an error signal.

Claim 5. (Previously Amended)      A method as in claim 4 wherein adaptively canceling interference on the first plurality of received signals further comprising

generating said counter-interference signal based on said error signal to cancel said interference.

Claim 6. (Previously Amended) A method as in claim 5 wherein adaptively canceling interference further comprises iteratively canceling interference on the first plurality of received signals until said error signal equals zero.

Claim 7. (Original) A method as in claim 1 wherein said adaptively canceling interference further comprises digitally and accurately replicating the interference.

Claim 8. (Previously Amended) A method as in claim 1 wherein said adaptively canceling interference on the first plurality of received signals is accomplished simultaneously.

Claim 9. (Previously Amended) A method as in claim 1 wherein said adaptively canceling interference on the first plurality of received signals is accomplished sequentially.

Claim 10. (Currently Amended) A method of digitally canceling interference in communication signals within a satellite payload on a first plurality of received signals within a satellite payload comprising:

- receiving a communication signal having interference;
- converting said communication signal into the first plurality of received signals;
- subtracting a counter-interference signal from the first plurality of received signals to form a desired signal;
- digitally processing said desired signal to form a second plurality of interference reference feedback signals;

correlating said second plurality of interference reference feedback signals to said desired signal to generate an error signal; and

adaptively canceling interference on the first plurality of received signals based on said error signal by generating said counter-interference signal to cancel said interference,

wherein the satellite payload receives a communication signal via a first antenna from a ground based terminal, said first antenna being coupled to an analog to digital converter to form an interference feedback signal which is transferred to a digital to analog converter to form a transmit signal which is transmitted by a second antenna to a ground based terminal.

Claim 11. (Currently Amended)      A satellite communication system comprising:

a first antenna for receiving a communication signal;

an analog-to-digital converter (ADC) electrically coupled to said first antenna, said ADC converting said communication signal to a first plurality of received signals;

a second antenna for receiving a transmit signal formed from said received signals by a digital to analog converter and for transmitting said transmit signal to a ground based terminal;

a satellite payload circuit comprising

a first input, said first input is electrically coupled to said ADC;

a second plurality of second inputs;

a third plurality of outputs;

a subtractor electrically coupled to said ADC, said subtractor subtracting a counter-interference signal from said first plurality of received signals to form a desired signal;

a digital processor electrically coupled to said subtractor, said digital processor generating a fourth plurality of interference reference feedback signals from said desired signal;

a correlator electrically coupled to said subtractor, said correlator comparing said fourth plurality of interference reference feedback signals to said desired signal to generate an error signal; and

a controller electrically coupled to said correlator and said subtractor, said controller adaptively canceling interference on said first plurality of received signals based on said error signal;

said satellite payload circuit digitally processing said first plurality of received signals to form said fourth plurality of interference reference feedback signals; and

a fifth plurality of feedback signal paths electrically coupling said third plurality of outputs to said second plurality of second inputs, said fifth plurality of feedback signal paths transferring said fourth plurality of interference reference feedback signals from said third plurality of outputs to said second plurality of second inputs,

wherein the signals generated by the digital to analog converter form a transmit signal which is transmitted by said second antenna to a ground based terminal.

Claim 12. (canceled)

Claim 13. (Currently Amended)      A communication system comprising:  
a first antenna for receiving a communication signal;

an analog-to-digital converter (ADC) electrically coupled to said first antenna, said ADC converting said communication signal to a first plurality of received signals; a second antenna for receiving a transmit signal formed from said received signals by a digital to analog converter and for transmitting said transmit signal to a ground based terminal;

a subtractor electrically coupled to said ADC, said subtractor subtracting a counter-interference signal from said first plurality of received signals to form a desired signal;

a digital processor electrically coupled to said subtractor, said digital processor generating a second plurality of interference reference feedback signals from said desired signal;

a correlator electrically coupled to said subtractor, said correlator comparing said second plurality of interference reference feedback signals to said desired signal to generate an error signal; and

a controller electrically coupled to said correlator and said subtractor, said controller adaptively canceling interference on said first plurality of received signals based on said error signal.

Claim 14. (canceled)